

WHAT IS CLAIMED IS:

1. A bearing material for a porous hydrostatic gas bearing comprising:

a backing metal made of stainless steel; and

a porous sintered metal layer integrated with at least one surface of said backing metal by means of a bonding layer, particles of an inorganic substance being contained in a dispersed manner at grain boundaries of said porous sintered metal layer,

the porous sintered metal layer which contains the particles of the inorganic substance being composed of 4 to 10% by weight of tin, 10 to 40% by weight of nickel, not less than 0.1 and less than 0.5% by weight of phosphorus, and the balance consisting of copper.

2. The bearing material for a porous hydrostatic gas bearing according to claim 1, wherein the particles of the inorganic substance are contained in said porous sintered metal layer at a rate of 2 to 10% by weight.

3. The bearing material for a porous hydrostatic gas bearing according to claim 1 or 2, wherein the particles of the inorganic substance are those of at least one of graphite, boron nitride, graphite fluoride, calcium fluoride, aluminum oxide, silicon oxide, and silicon carbide.

4. The bearing material for a porous hydrostatic gas bearing according to any one of claims 1 to 3, wherein said backing metal is formed into a hollow cylindrical shape, and said porous

sintered metal layer containing the particles of the inorganic substance in a dispersed manner is integrated on one cylindrical surface of said backing metal by means of said bonding layer.

5. The bearing material for a porous hydrostatic gas bearing according to any one of claims 1 to 3, wherein said backing metal is formed into a planar shape, and said porous sintered metal layer containing the particles of the inorganic substance in a dispersed manner is integrated on one planar surface of said backing metal by means of said bonding layer.

6. The bearing material for a porous hydrostatic gas bearing according to any one of claims 1 to 5, wherein said bonding layer includes at least a nickel plated layer, and the nickel plated layer is bonded to at least one surface of said backing metal.

7. The bearing material for a porous hydrostatic gas bearing according to any one of claims 1 to 5, wherein said bonding layer is comprised of two plated layers including a nickel plated layer and a copper plated layer, the nickel plated layer being bonded to at least the one surface of said backing metal, the copper plated layer being bonded to the nickel plated layer.

8. The bearing material for a porous hydrostatic gas bearing according to claim 7, wherein the copper plated layer is bonded to an obverse surface of the nickel plated layer.

9. The bearing material for a porous hydrostatic gas bearing according to claim 7 or 8, wherein the copper plated layer has

a thickness of not less than 10 μm and not more than 25 μm .

10. The bearing material for a porous hydrostatic gas bearing according to claim 7 or 8, wherein the copper plated layer has a thickness of not less than 10 μm and not more than 20 μm .

11. The bearing material for a porous hydrostatic gas bearing according to any one of claims 6 to 10, wherein the nickel plated layer has a thickness of not less than 2 μm and not more than 20 μm .

12. The bearing material for a porous hydrostatic gas bearing according to any one of claims 6 to 10, wherein the nickel plated layer has a thickness of not less than 3 μm and not more than 15 μm .

13. A porous hydrostatic gas bearing using said bearing material according to any one of claims 1 to 12, wherein said backing metal is provided with means for supplying a compressed gas to said porous sintered metal layer containing the particles of the inorganic substance in a dispersed manner.

14. A bearing material for a porous hydrostatic gas radial bearing comprising:

a backing metal made of stainless steel and having a cylindrical inner surface;

a plurality of annular groove portions which are provided in the inner surface of said backing metal in such a manner as to be juxtaposed in an axial direction and to be open on an inner surface side;

a dead-end hole portion for mutual communication provided inside said backing metal in such a manner as to extend in an axial direction of said backing metal from one annular end face of said backing metal toward another annular end face thereof, to allow the annular grooves to communicate with each other; and

a hollow cylindrical porous sintered metal layer for covering openings of each of the annular groove portions on the inner surface side of said backing metal, and integrated with the cylindrical inner surface of said backing metal by means of a bonding layer.

15. The bearing material for a porous hydrostatic gas radial bearing according to claim 14, wherein one end of said dead-end hole portion for mutual communication is open at an annular end face of said backing metal, and another end of said dead-end hole portion for mutual communication is closed by said backing metal itself short of another annular end face of said backing metal.

16. The bearing material for a porous hydrostatic gas radial bearing according to claim 15, further comprising fitting means for fitting a plug for closing the one end of said dead-end hole portion for mutual communication.

17. The bearing material for a porous hydrostatic gas radial bearing according to claim 16, wherein said fitting means has a thread groove.

18. The bearing material for a porous hydrostatic gas radial

bearing according to any one of claims 14 to 17, further comprising a dead-end hole portion for supplying a compressed gas provided inside said backing metal in such a manner as to be open at an outer surface of said backing metal and extending radially from the outer surface of said backing metal toward said dead-end hole portion for mutual communication.

19. The bearing material for a porous hydrostatic gas radial bearing according to any one of claims 14 to 18, wherein said porous sintered metal layer includes grain boundaries of a sintered metal containing tin, nickel, phosphorus, and copper, and particles of an inorganic substance dispersed at the grain boundaries of the sintered metal.

20. The bearing material for a porous hydrostatic gas radial bearing according to claim 19, wherein 4 to 10% by weight of tin, 10 to 40% by weight of nickel, not less than 0.1 and less than 0.5% by weight of phosphorus, and the balance including copper are contained at grain boundaries of the sintered metal.

21. The bearing material for a porous hydrostatic gas radial bearing according to claim 19 or 20, wherein the particles of the inorganic substance are contained at a rate of 2 to 10% by weight.

22. The bearing material for a porous hydrostatic gas radial bearing according to any one of claims 19 to 21, wherein the particles of the inorganic substance are those of at least one of graphite, boron nitride, graphite fluoride, calcium fluoride, aluminum oxide, silicon oxide, and silicon carbide.

23. The bearing material for a porous hydrostatic gas radial bearing according to any one of claims 14 to 22, wherein said bonding layer includes at least a nickel plated layer, and the nickel plated layer is bonded to the cylindrical inner surface of said backing metal.

24. The bearing material for a porous hydrostatic gas radial bearing according to any one of claims 14 to 23, wherein said bonding layer is comprised of two plated layers including a nickel plated layer and a copper plated layer formed on an obverse surface of the nickel plated layer, the nickel plated layer being bonded to the cylindrical inner surface of said backing metal, the copper plated layer being bonded to the nickel plated layer.

25. The bearing material for a porous hydrostatic gas radial bearing according to claim 24, wherein the copper plated layer has a thickness of not less than 10 μm and not more than 25 μm .

26. The bearing material for a porous hydrostatic gas radial bearing according to claim 24, wherein the copper plated layer has a thickness of not less than 10 μm and not more than 20 μm .

27. The bearing material for a porous hydrostatic gas radial bearing according to any one of claims 23 to 26, wherein the nickel plated layer has a thickness of not less than 2 μm and not more than 20 μm .

28. The bearing material for a porous hydrostatic gas radial bearing according to any one of claims 23 to 26, wherein the nickel plated layer has a thickness of not less than 3 μm and not more than 15 μm .

29. A porous hydrostatic gas radial bearing using said bearing material according to any one of claims 14 to 28.

30. The porous hydrostatic gas radial bearing according to claim 29, wherein a plug for closing one end of said dead-end hole portion for mutual communication is fitted in the one end thereof.